

Commodore Single Disk Drive

Technical Manual

Model 1540/1541



commodore
COMPUTER

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Chapter One

1.1 Scope

In this chapter, a description is made of the procedures necessary for servicing the Model 1540/1541 Floppy Disk Drive.

1.2 Unpacking

Special care should be exercised during unpacking not to damage the unit.

Unpacking procedures are as follows:

- a) Remove cardboard sleeve from styro-foam box
- b) Open 'styro-foam' box and remove drive
- c) Check the drives front door for proper operation

```
*****
*                                     *
*           Caution                 *
*                                     *
*   Do Not Use Magnetized Tools   *
*                                     *
*****
```

1.3 Protection against noise

A weak signal from the media is detected in the head section of the drive. Hence, **do not** install the drive near a TV set or other areas where electromagnetic noise is generated. (i.e. motors, air-conditioners, etc)

1.7 Input/Output Cable

The length of the cable between the host and the drive (between the host and the last drive when the drives are daisy chained) should not exceed 5 meters (16 feet).

1.8 DC power source

The drive is powered by a internal power supply providing the drive with +12V and +5V.

1.9 Initial inspection

The drive can be briefly inspected for its operation by the following procedure. Install the drive, connect the power and I/O cables. Turn drive on and make sure the front panel power lamp is on. Proceed to step 2.2.

1.10 Outline of functions

The 1540/1541 Minifloppy Disk Drive mechanism is composed of the data read/write head, track positioning mechanism, spindle drive mechanism and eject mechanism.

1.11 Read/Write Head

The Read/Write head uses a glass-bonded, ferrite/ceramic head. Track-to-track erasing is accomplished by the straddle erase method. The surface of the Read/Write head is mirror-ground to minimize wear of the head and media. Also, the head is designed in such a way that the maximum signal can be obtained from the media surface.

1.12 Track positioning mechanism

Positioning of the Read/Write Head is accomplished by a stepping motor and steel belt. The stepping motor rotates clockwise or counter-clockwise by two steps per track. The control circuit on the logic board selects the direction and number of step to the desired track.

1.13 Spindle drive mechanism

The spindle drive motor operates on 12 VDC and turns the spindle, through a belt drive, at 300 revolutions per minute. The speed of the drive motor is controlled by a feedback signal from a tachometer which is housed in the drive motor assembly. The feedback signal controls a servo amp that supplies the 12 VDC drive current.

1.14 Eject mechanism

When the media is inserted in the Disk Drive and the door is closed the media is clamped by the spindle and hub. At this time the ejector mechanism is loaded by the insertion of the disk and locked. When the door is opened, the ejector mechanism is unlocked and the media pops out of the door.

Chapter Two

2.1 Mechanism Explanation

The 1540/1541 mechanism is installed in the system horizontally, however the drive will function if mounted vertically. The mechanical parts of the drive include an aluminum chassis, a stepping motor, head positioning assembly, drive motor, a hub and spindle assembly for centering and retaining the media during operation. The magnetic head is of a glass ceramic construction.

2.2 Function explanation

The drive is itself an independent memory device. The drive is composed of a media clamp rotating mechanism, ahead positioning mechanism and an eject mechanism. When the front door opens, the media can be inserted. All positioning operation excluding insertion and removal of the media are controlled by the internal guide mechanism. Closing the front door causes the media clamp mechanism to operate. Two operations are performed in the following order:

- a) The media is centered.
- b) The media is clamped and retained between the spindle and the hub.

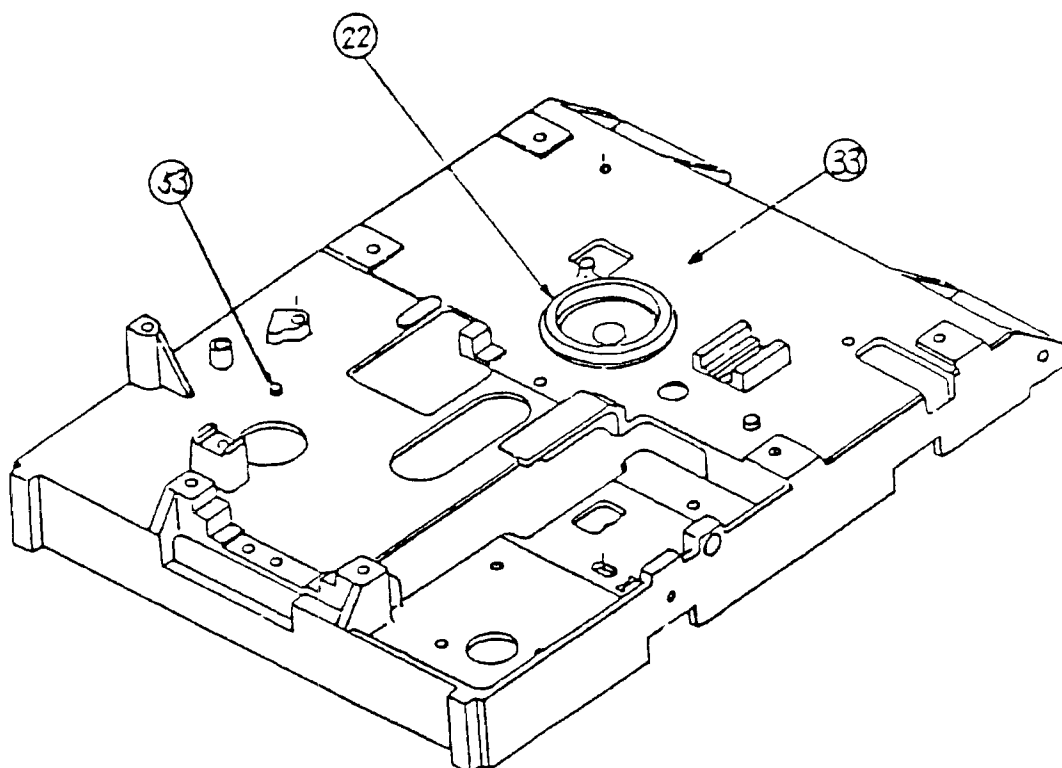
The spindle and hub rotate at 300 r.p.m. through a closed-loop control circuit employing a D.C. motor/tachometer. It is important that the relationship between the head and the media is maintained correctly during operation. For this purpose, a pressure pad is used to hold and press down the media (about 12g) from the opposite side of the head, to maintain the correct contact with the head. This head assembly is coupled by a metal band to a four phase stepping motor the performs the track positioning. One step of the stepping motor corresponds to a 1/2 track movement. Use of a high-speed stepping motor and metal band drive, this series of disk drives can perform access operations at a very high speed.

2.3 Assembly Procedure

- 2.3.1 The housing assembly; install the eject pin and the spindle.
- 2.3.2 The housing assembly; on the reverse side install the spindle pulley.

2.3.3 FIG 1, The housing unit.

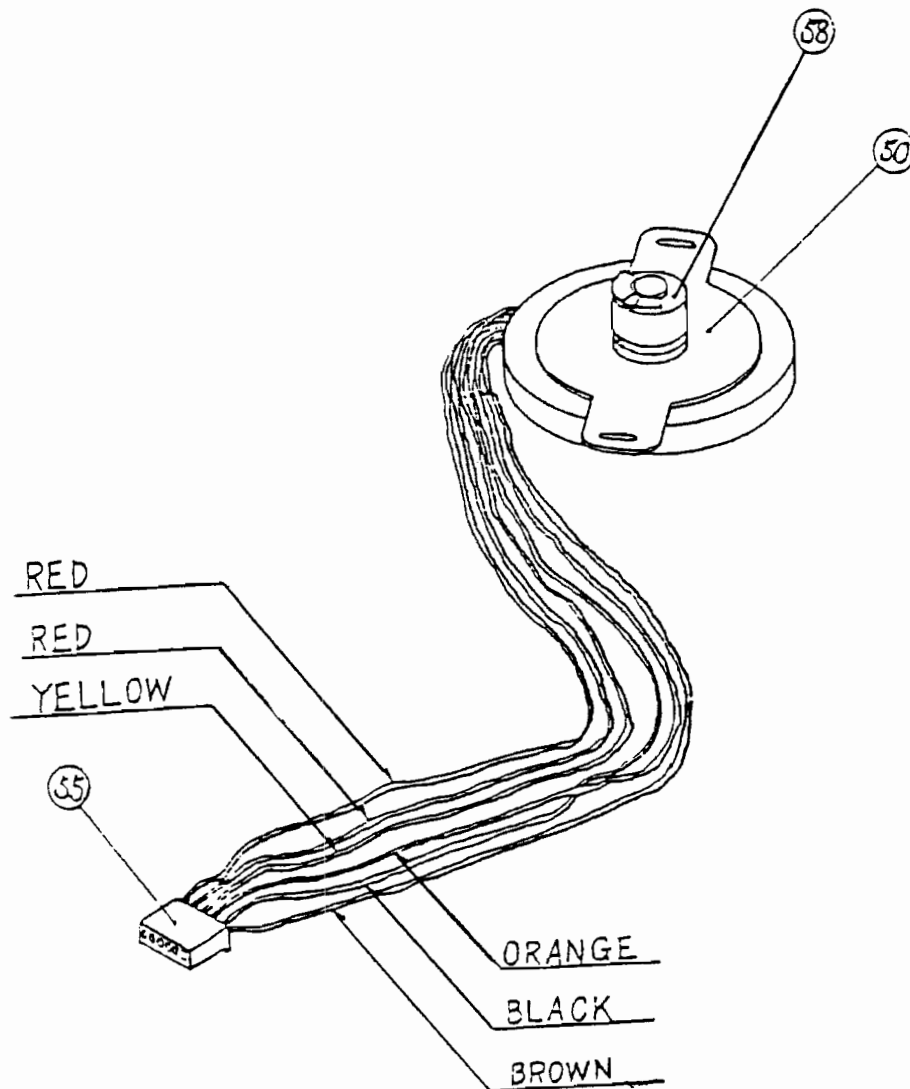
Part	Description
22	spindle
33	housing assembly.
53	eject pin



2.3.4 The stepping motor assembly; install the stepping pulley.

2.3.5 FIG 2, The stepping motor unit

Part	Description
50	stepping motor assembly
55	connector housing
58	stepper pulley



2.3.6 The D.C. motor assembly; install the motor pulley.

2.3.7 FIG 3, D.C. motor and control PCB

Part	Description
44	motor control PCB
48	D.C. motor
51	connector housing
59	D.C. motor pulley

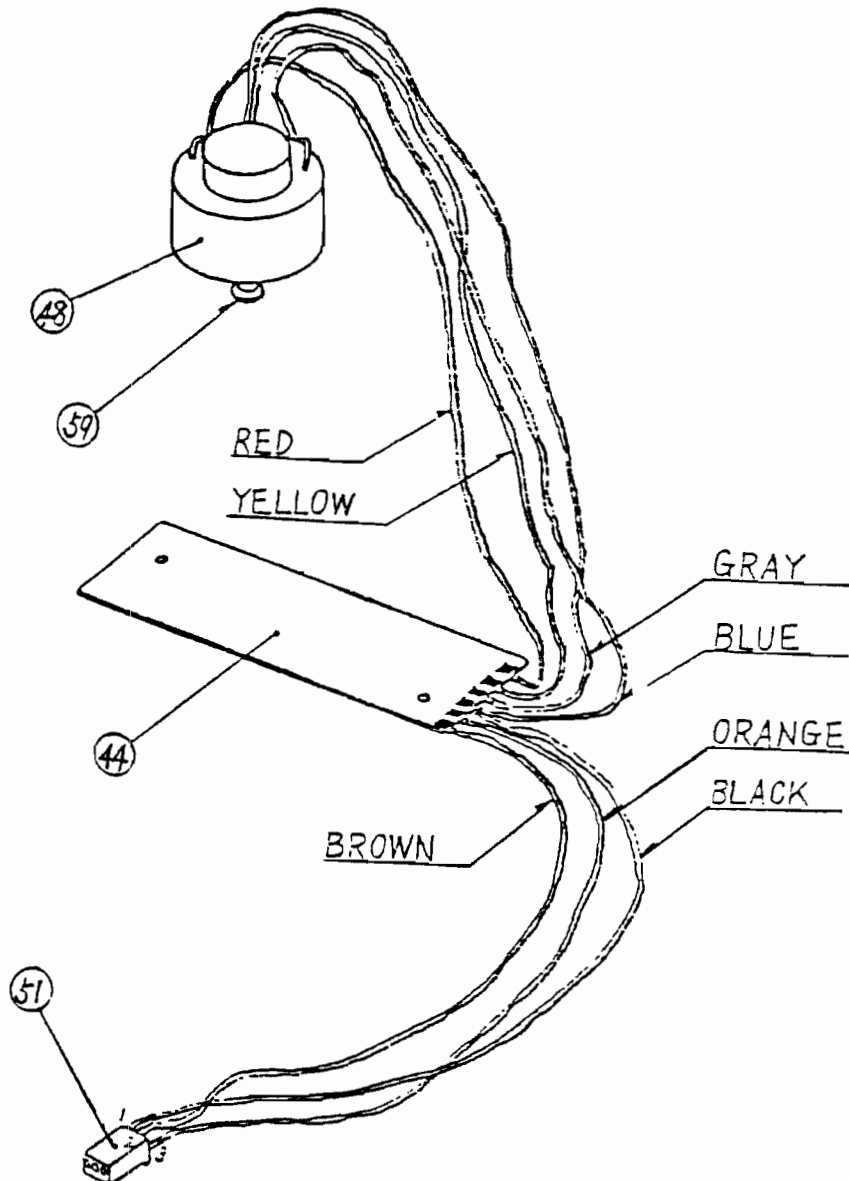


FIG. 6

Part	Description	Part	Description
20	binder screw	37	washer
21	diskette guide	38	eject spring
28	LED clamp	39	eject plate
29	front panel	40	slider
30	Flush screw	43	diskette guide
31	LED assembly	52	connector housing
32	LED holder ring		

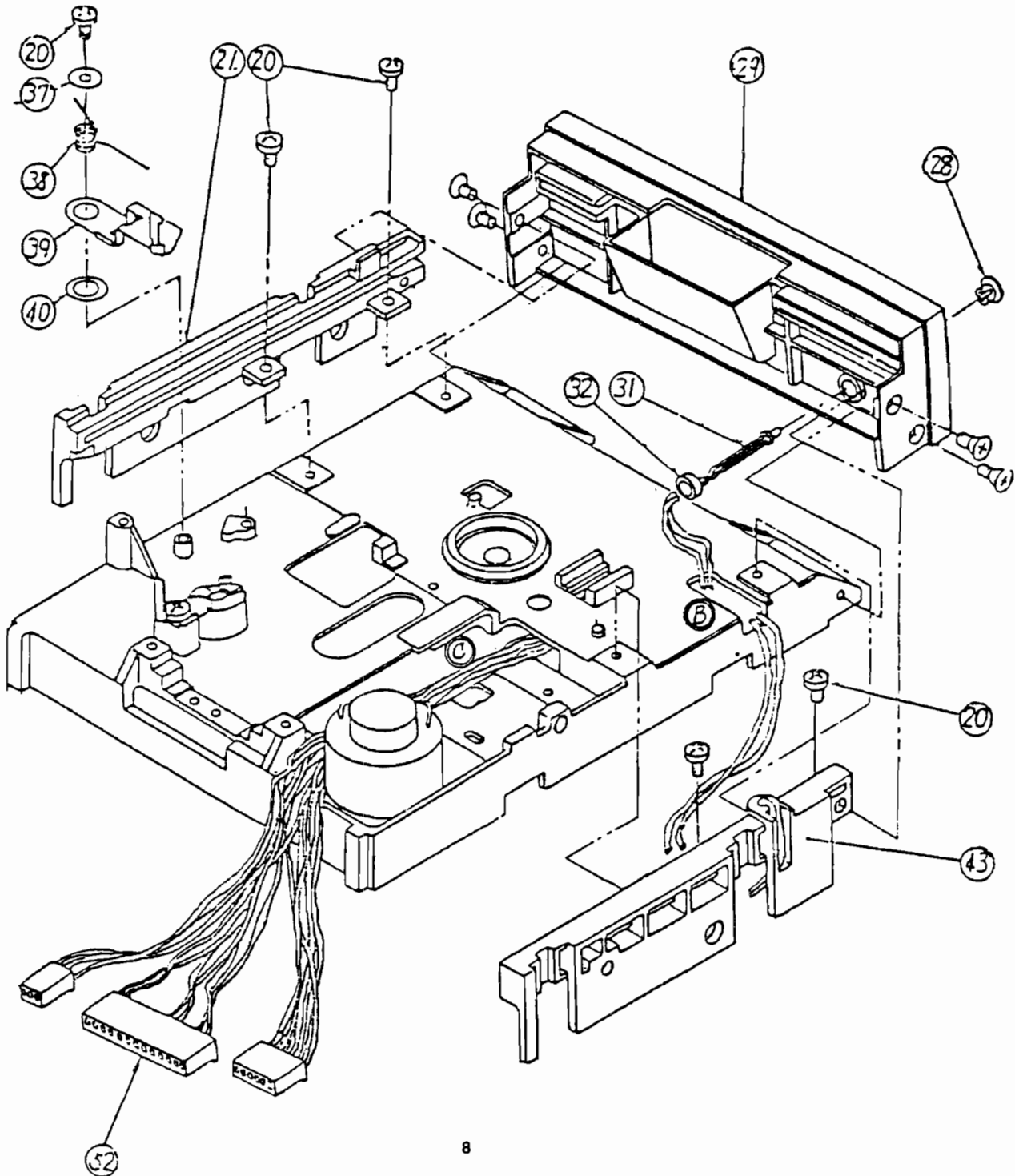


FIG 7.

Part	Description
------	-------------

- | | |
|----|--------------------|
| 15 | binder screw |
| 18 | binder screw |
| 24 | tension pulley |
| 25 | guide shaft keeper |
| 26 | guide shaft |
| 34 | metal band |
| 35 | washer |
| 36 | head assembly |
| 56 | tension spring |

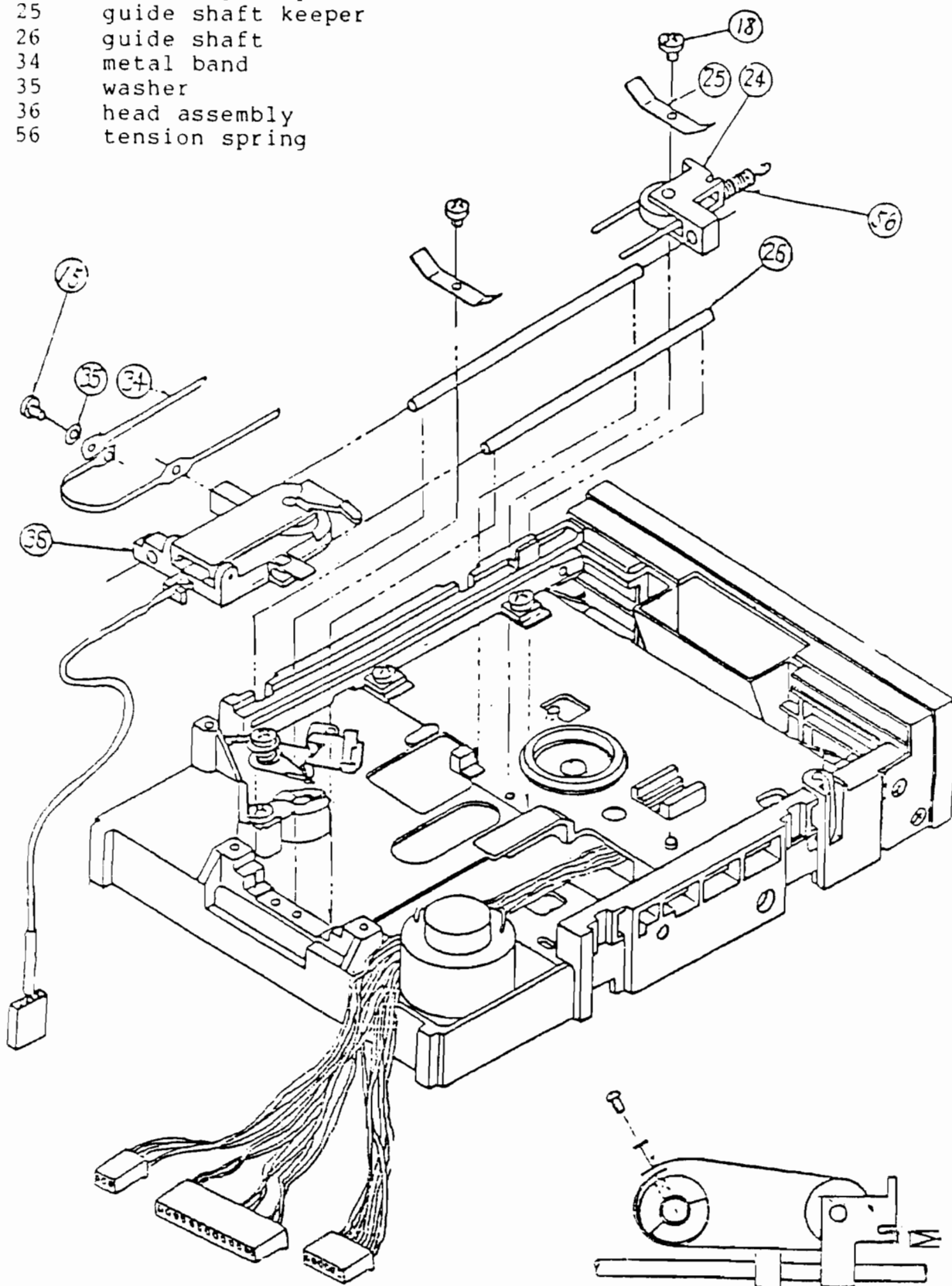


FIG 8

Part	Description
20	binder screw
45	clamp
49	cable ties

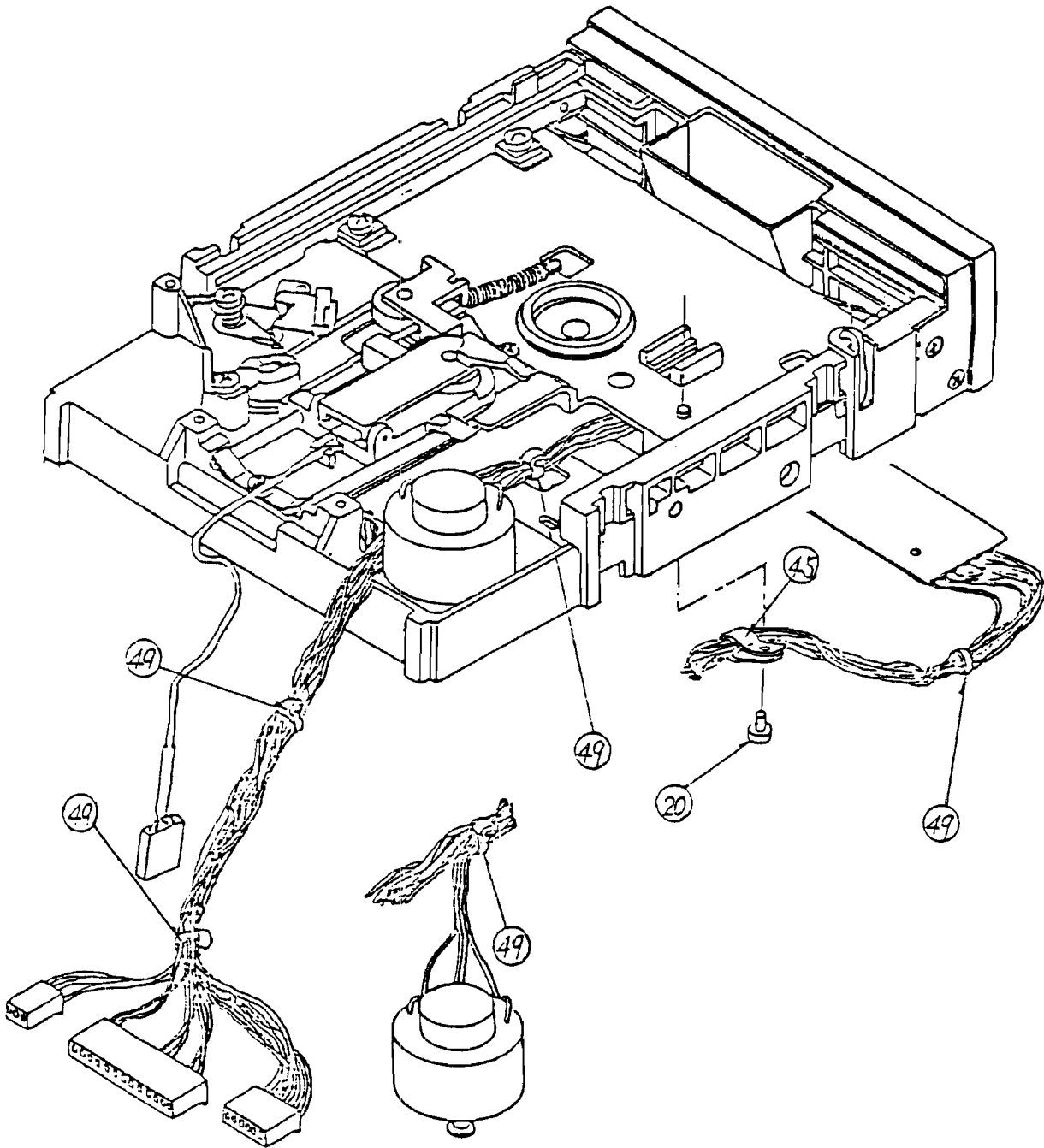
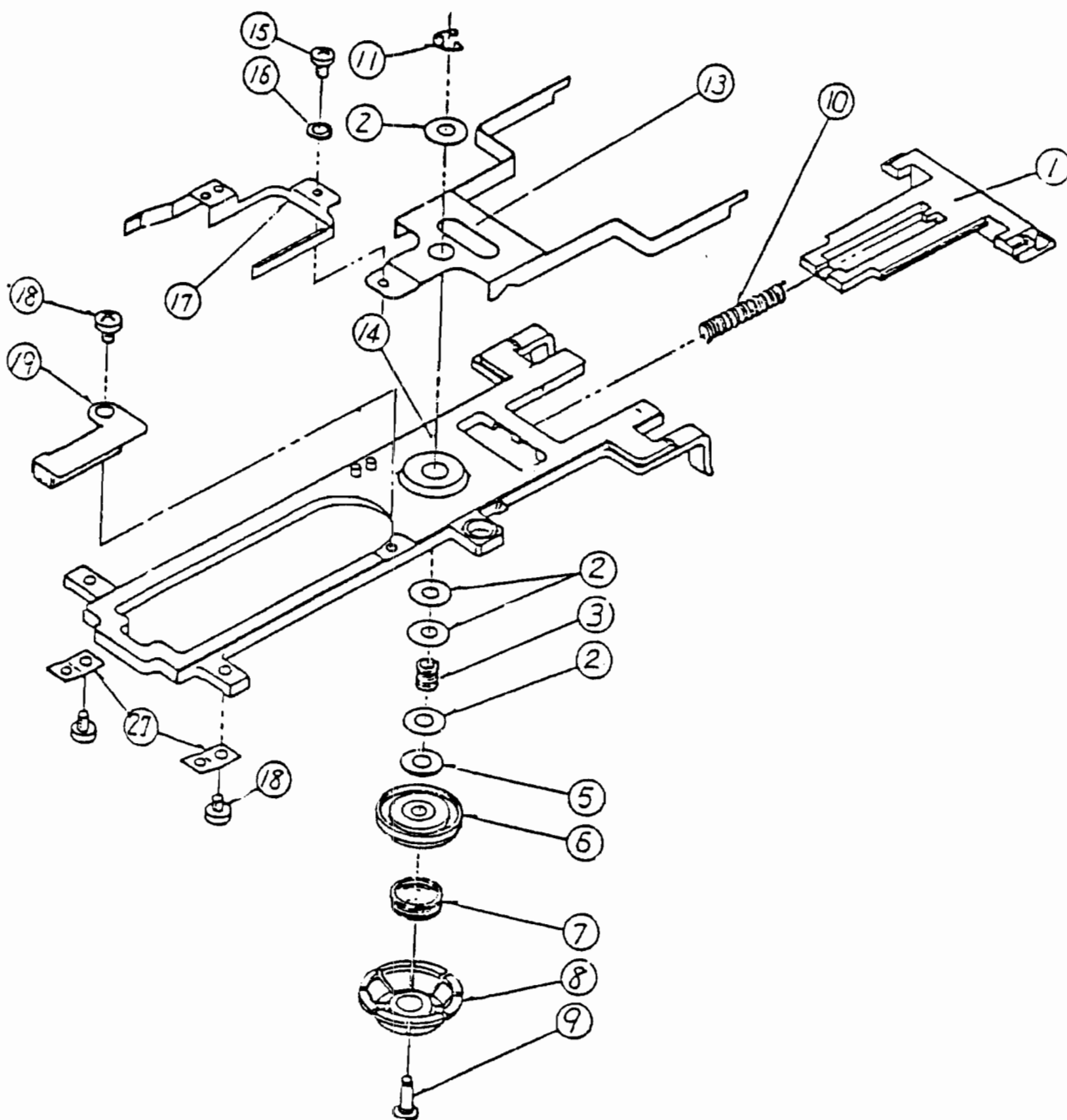


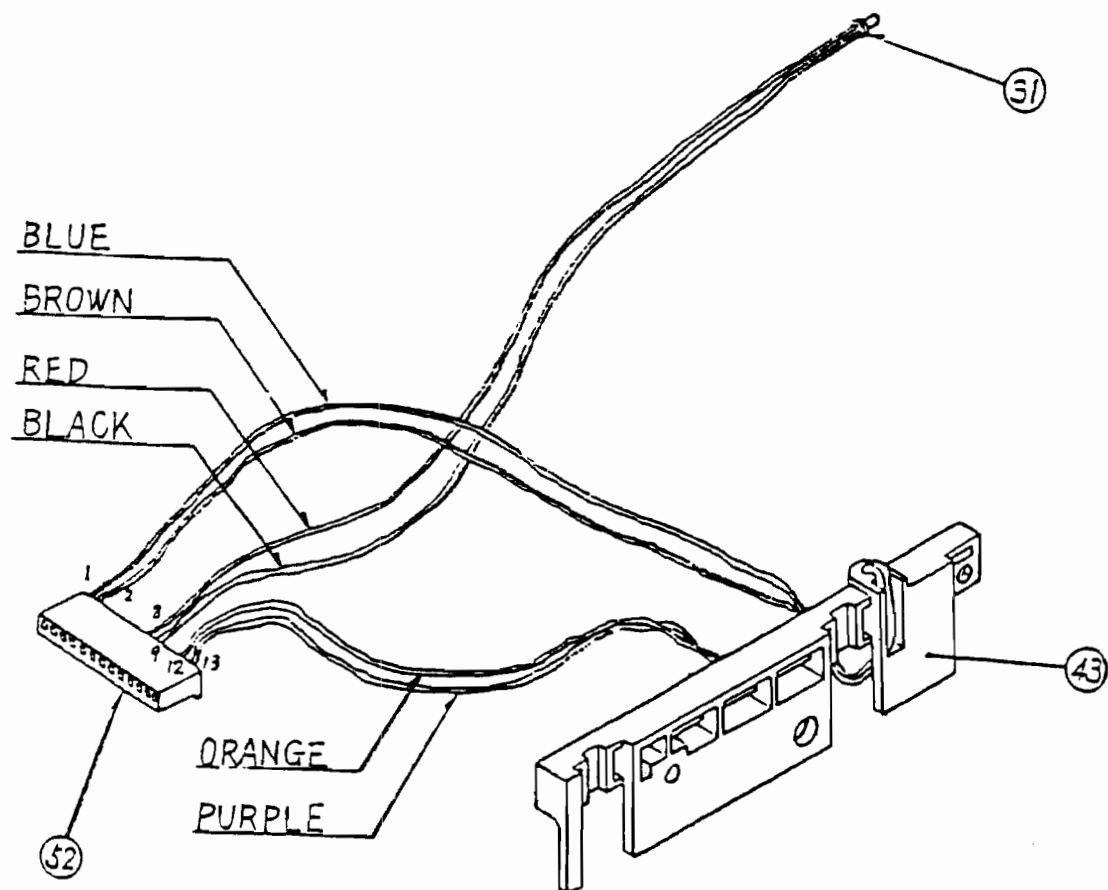
FIG 9

Part	Description	Part	Description
1	door assembly	13	hub support
2	collar	14	hub frame
3	clamp spring	15	binder screw
5	thrust washer	16	spring washer
6	collet assembly	17	arm support assembly
7	hub spring	18	binder screw
8	hub	19	pad plate assembly
9	hub shaft	27	hinge spring
10	door spring	60	collet
11	E-washer	61	collet bearing



2.3.8 FIG. 4, Diskette guide, LED assembly and connector housing.

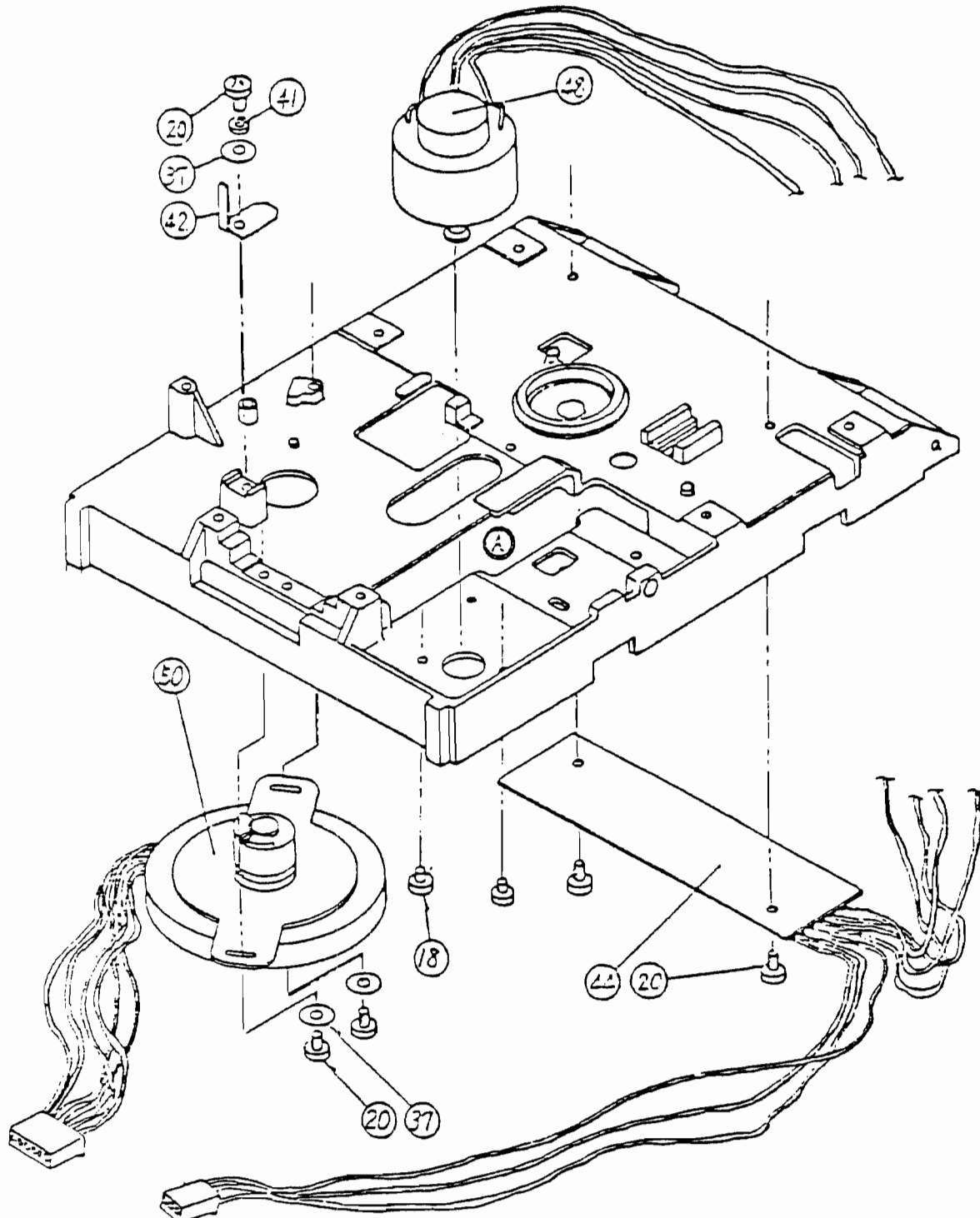
Part	Description
31	LED assembly
43	diskette guide
52	connector housing



- 2.3.9 Secure the D.C. motor from the reverse side of the housing assembly with two screws.
- 2.3.10 Put the motor control PCB into hole 'A' and secure it with two screws.
- 2.3.11 Secure the stepping motor with two screws.
- 2.3.12 Secure the carriage stopper with a screw.
- 2.3.13 Install the connector housing '52' into the hole 'B' and remove through hole 'C'.
- 2.3.14 Secure the two diskette guides '21' and '43' with two screws each.
- 2.3.15 Install the LED holder in the front panel.
- 2.3.16 Insert the LED assembly into the LED holder ring.
- 2.3.17 Install the led into the LED holder, then push the LED holder ring onto the LED holder.
- 2.3.18 Attach the front panel with four flush screws.
- 2.3.19 Secure the eject plate with a screw.
- 2.3.20 Wind the metal band around the tension pulley.
- 2.3.21 Insert the guide shafts into the head assembly. Install the tension pulley as shown in figure 8
- 2.3.22 Secure the guide shaft keepers by two screws each.
- 2.3.23 Wind the metal band around the stepper pulley and secure it with a screw to the stepper motor pulley.
- 2.3.24 Hook the spring to the tension pulley and install unit in the slot in the housing assembly.
- 2.3.25 Hook the opposite end of the spring to the housing assembly.
- 2.3.26 Fasten cable ties to the cables.
- 2.3.27 Secure the cable clamp with a screw as shown in FIG 8.
- 2.3.28 Secure the arm support assembly with a screw to the hub support.
- 2.3.29 Insert the hub shaft into the hub, the hub spring, the collet assy, the thrust washer, the collar, the clamp spring and two collars.
- 2.3.30 Insert the hub shaft into the frame and the hub support and fasten it at the E-washer.
- 2.3.31 Set the door assembly and the door spring at the hub frame.
- 2.3.32 Secure the pad plate assembly with a screw to the frame at the location shown in FIG 9
- 2.3.33 Secure the two hinge springs with two screws each.

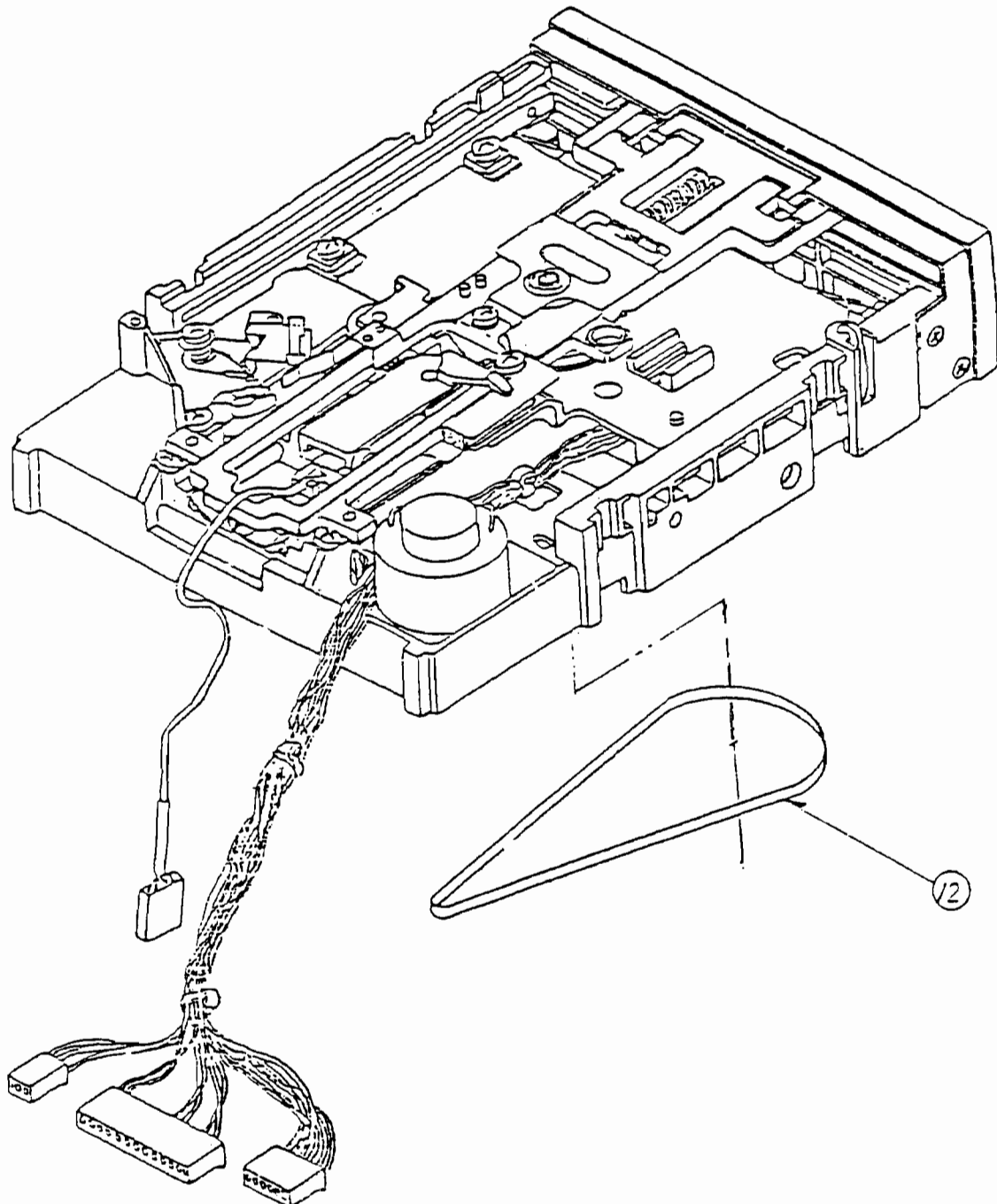
FIG. 5

Part	Description
18	binder screw
20	binder screw
37	washer
41	spring washer
42	carriage stopper
44	motor control PCB
50	stepping motor assembly

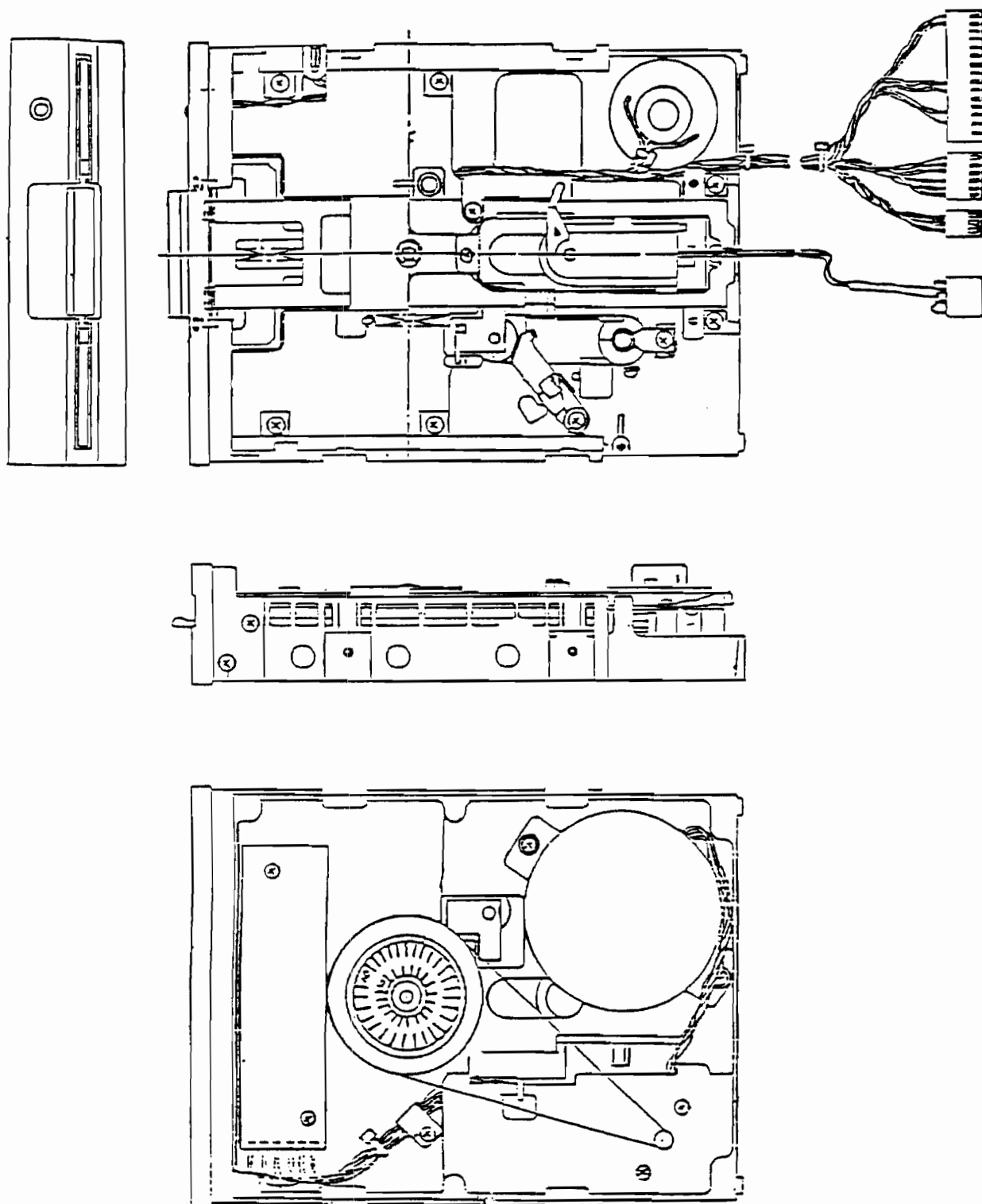


- 2.3.36 Place the belt over the D.C. motor pulley and partially on the spindle pulley.
- 2.3.37 By turning the spindle pulley the rest of the belt will seat completely on the pulley.
- 2.3.38 FIG 10

Part	Description
12	drive belt



2.3.39 FIG 11; Completed Drive Mechanism



3.1 Description

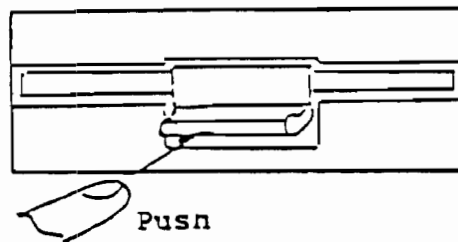
Since the disk drive is placed under direct control of the interface and power supply, no special procedure is required for starting and operation.

3.2 Operating procedure

Make sure that the power supply and I/O connector are connected, then insert the disk in accordance with the following procedure.

3.2.1 Inserting the media

- a) Apply DC voltage to the drive.
- b) Open the front door.



- c) With the index hole and write protect notch being placed on the left side of the jacket, push the media in, when the media is fully inserted the locking action can be felt.
- d) Push the door downward and close the door so that it is locked firmly

3.2.2 Extracting the media

- a) Open the front door. The media will pop out automatically to a position where you can extract it easily.
- b) For protection of the recorded data, the media should always be stored in its envelope.
- c) Close the door of the drive.

3.3 Media handling procedure

Since the media has been subjected to a write operation it naturally contains information, adequate attention must be paid to its handling.

In order to extend the life of the media and eliminate the causes of errors, it is best to take the following steps:

- a) When writing something on the jacket label of the media, do **not** use a ball point pen or pencil, use felt-tipped pens.
- b) **Do not** hold the edges of the media with paper clips or the like.
- c) **Do not** touch the media exposed in the slot of the jacket.
- d) **Do not** attempt to clean the media.
- e) **Do not** keep the media in the areas where there is a strong magnetic field.
- f) The diskette should be kept in its jacket.
- g) Special care should be exercised so that the media is kept free from liquid, dust, metal particles, etc.
- h) Take care not to exceed the following environmental conditions:

Temperature 10 to 51°C
Relative humidity 8 to 80 %

3.4 Seek error

Few seek errors will be experienced due to the low stepping rate, less than 12 msec/track. In case of a seek error, however, recalibration of track position can be performed. This can be done by repeatedly stepping the head towards track 0 untill track 0 status is detected.

3.5 Write error

In order to check the quality of the data, perform a read-after-write operation. When data can not be read, rewrite that track and sector once again.

When data can not be read after four such operations track is defective.

3.6 Read error

What happens quite often when performing a read operation is a soft error. A soft error is defined to be a read error which is recoverable by making ten or less read operations. However, in the event no recovery is made in ten operations, move one step from the track in the same direction as the previous step, then return one step. If this fails to read the data, this error is unrecoverable.

3.7 Description

Periodic maintenance is indispensable so that this type of peripheral equipment operates properly. It is particularly important to periodically clean the head and check the load pad. Repairs and adjustments should be made in accordance with the procedures below.

3.8 Head Cleaning

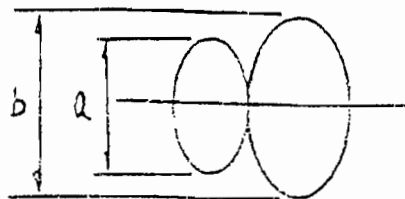
Check for excessive dust or magnetic oxide on the load pad. With the door open (do not move upper arm greater than what is provided by opening the front door) clean head with lint free cotton cloth or 'Q-tip' in 91% isopropyl alcohol. Wipe the head carefully to remove any dust and/or oxide.

3.9 Adjustment procedure

In case of a malfunction or parts replacement, make the following adjustments. In order to maintain the interchangeability of the media between drives it is desirable to check each drive against a master alignment diskette.

3.9.1 Track adjustment (radial track)

- a) Connect I/O cable and restore the head to track 00.
- b) Insert a 48tpi alignment diskette and close the door.
- c) Connect two oscilloscope probes to pin 1 and pin 14 of UH6 (592), set oscilloscope to analog mode at 50mV/cm and 200 msec/div.
- d) Load the head and allow it to seek to track 16, check for cats eye wave form. When the cats eye lobe ratio is 70% or less, loosen the stepping motor mounting screws, turn the stepping motor to obtain the lobe ratio of 90% or less.
- e) After allowing the head to track 34, return it to track 16 and recheck the cats eye. If the ratio is correct tighten the stepping motor screws.



$$\frac{a}{b} \times 100 \geq 70$$

Cats eye lobe ratio

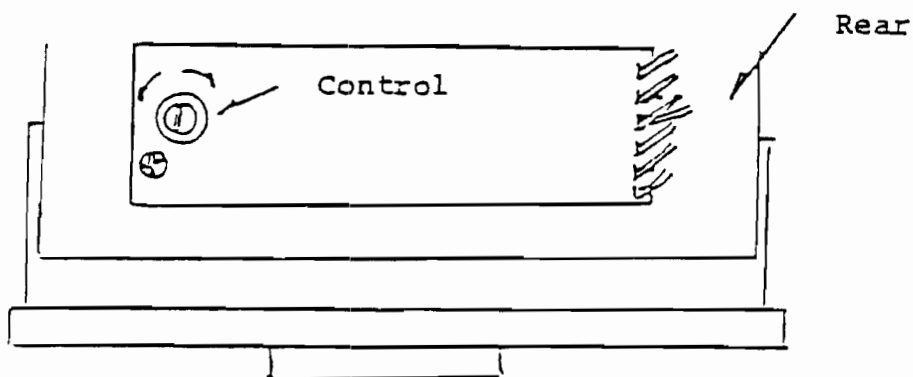
3.9.2 Track 00 adjustment

The drive is not provided with a track 00 sensor. To adjust, let the head over step in the track 00 direction and adjust the limiter position to obtain a clearance less than 0.25mm (0.01inches).



3.9.3 Speed control

Turn the variable resistor on the motor control board until the tachometer disk on the spindle pulley appears stationary when viewed with a fluorescent lamp.



QUANTITY RECD PER PART / DASH NO.		ITEM	Q	PART NUMBER	DESCRIPTION	REF DES	Q	NOTES
	0201	1	B	1540050	PC BOARD 238 X155 X1.60			GLASS EPOXY. G-10
		2						
		3						
		4						
		5	C	1540049-01	SCHEMATIC DIAGRAM			USED LOGIC ARRAY. FCC (UL)
		7						
		8						
		9						
		10						
		11						
		12	B	901435-01	IC MPS 6502 CPU	UC4		
		13	I	901437-01	MPS 6522 VIA	UC2, UC3		
		14		901229-03	2364-197 ROM	UB4		\$E000 ~ \$FFFF
		15		325302-01	2364-130 ROM	UB3		\$C000 ~ \$DFFF
		16		325572-01	LOGIC ARRAY 40 PIN DIP	UC1		
		17		901521-01	74LS00 2-NAND	UC6		
		18		901521-17	74LS42 DEC.	UC7		
		19		901522-01	7417 BUFFER	UD2		
		20		901521-32	74LS86 2-EX-OR	UD3		
		21		901522-06	7406 INV. BUF.	UB1, UD1		
		22		901521-02	74LS04 INV.	UC5		
		23		901521-30	74LS14 SCH. INV.	UA1		
		24		901521-26	74LS193 4 BIT. COU.	UE6		
		25		901521-54	74LS197	UD5		
		26		901522-03	74177	UD5		SUBSTITUTE FOR ITEM 25.
		27		901510-01	9602	UD4		
		28	I	901523-04	LM311	UE4		
		29	B	901523-08	IC NE592	UF3, UF4		
		30	B	325502-03	IC TM42016P RAM	UB2		SUBSTITUTE FOR ITEM 30.
		31	B	325502-01	IC M58725P RAM	UB2		SUBSTITUTE FOR ITEM 19.
		32	B	901522-30	IC 7407	UD2		
		33						
		34						
		35						
		36						
		37						

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PCB ASSY. VIC-1541

DATE: 12/77
BY: T.H.
CHKD: T.H.

ENGR: 70
DATE: 12/77
BY: T.H.
CHKD: T.H.

REV: C
DATE: 12/77
BY: T.H.
CHKD: T.H.

1540048

QUANTITY REQD PER PART / DASH NO.				TITLE		PCB ASST. VIC-1541		commodore			
QTY	8	PART NUMBER	DESCRIPTION	REF DES	QTY	NOTES	DATE	ENG'R	DATE	REV	REV
01							10/15/82	11/6	12/17	C	1540048
2	B	902671	TRANSISTOR NPN 2SC945	Q2-Q7		SUBSTITUTE FOR ITEM 38.					
3	B	902693-01	2SC1815	Q2-Q7							
4	B	902679	2SD467	Q8-Q11							
5	B	902682	NPN 2SC2120	Q8-Q11		SUBSTITUTE FOR ITEM 40.					
1	B	902720	PNP 2SA673	Q1							
4	B	902717	2SA733	Q3-Q6							
5	B	902744-01	TRANSISTOR PNP 2SA1015	Q3-Q6		SUBSTITUTE FOR ITEM 43.					
45											
46											
47											
48											
49											
50											
51											
6	B	900750-02	DIODE, RECTIFIER IN4002	CR248-11							
8	B	900850-05	SIGNAL W6713C	CR67124-B							
5	B	900850-01	SIGNAL IN4148	CR67124-B		SUBSTITUTE FOR ITEM 53.					
1	B	325505-01	ZENER 3.3V 500mW ±5%	CR5		HE3C-2					
5	B	325505-02	3.3V 500mW ±5%	CR5		HE4A-1 SUB. FOR ITEM 55.					
5	B	900948-06	3.3V 500mW ±5%	CR5		IN3226B SUB. FOR ITEM 55.					
1	B	325506-01	5.1V 500mW ±5%	CR13		HE3C-2					
5	B	900948-11	ZENER 5.1V 500mW ±5%	CR13		IN5231 SUB. FOR ITEM 58.					
2	B	900756-01	DIODE BRIDGE 1.5A 50V	CR1,CR3		KBP-005					
61											
62											
63											
1	B	325566-01	CRYSTAL MODULE 16 MHz 50PPM	Y1							
5	B	325566-02	CRYSTAL MODULE 16 MHz 100PPM	Y1		SUBSTITUTE FOR ITEM 64.					
66											
67											
68											
1	B	325513-01	COIL, INDUCTOR 2.2μH	L1							
2	B	325513-02	COIL, INDUCTOR 22μH	L9, L10							
3	B	325513-03	COIL, INDUCTOR 100μH	L8, L11, L12							
72											
73											
74											
DATE: 10/15/82											
DRAWN BY: 7.7.6.4											
CHKD: 11/6											
APPR: 12/17											
REV: C											
REV: 1540048											
SIZE: B											
REV: 3/8											

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TITLE: PCB ASST. VIC-1541

DRAWN BY: 7.7.6.4
CHKD:

DATE: 11/16/82

ENGR: JLC

DATE: 12/72

SIZE: B

REV: C

1540048

QUANTITY REQD PER PART / DASH NO.			TITLE: commodore		PCB ASSY. VIC-1541		DRAWN BY: J. T. Kudo		ENGR: J. E.		DATE: 12/17		APPR: J. H.		DATE: 12/18		SIZE: B		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C		REV: C</	
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QUANTITY REQD PER PART / DASH NO.				3		PART NUMBER	DESCRIPTION	REF DES	QTY	NOTES
				8						
1	112	B	900301-04			CAPACITOR ELECT.	220µF/10V	C13		
1	113		900101-45				6800µF/25V	C17		
1	114		900101-32				4700µF/16V	C16		
2	115		900100-33				47µF/16V	C2,C5		
2	116		900100-32			ELECT.	1µF/25V	C1,C4		
1	117		900402-15			TANTALIUM	10µF/25V	C15		
1	118		900402-11			TANTALIUM	3.3µF/25V	C44		
1	119		900010-52			CERAMIC	150µF/50V	C31	±5%	
2	120		-53				330µF/50V	C32,C36	±5%	
3	121		-54				680µF/50V	C45,C33,C34	±5%	
1	122		-25				1000µF/50V	C41		
24	123		-20				0.1µF/50V	C3,6-10		14,18,19,20,22-30,35,40,43,47,48
2	124		900010-14			CERAMIC	0.022µF/50V	C39,C42		
1	125		900100-40			ELECT.	100µF/16V	C46		
2	126		900402-17			TANTALIUM	0.47µF/25V	C37,C38		
1	127		-08				4.7µF/25V	C21		
1	128		900402-14			TANTALIUM	1µF/16V	C11		
1	129	B	900465-02			CAPACITOR CERAMIC	0.033µF/25V	C12		
	130									
	131									
	132									
	133									
1	134	B	901550-56			RESISTOR CARBON	1/4W ±5% 47Ω	R1		
2	135	B	901550-108			RESISTOR CARBON	1/4W ±5% 360Ω	R14,R24		
4	136		-89				150Ω	R17,R18,45,46		
4	137		-52				220Ω	R4,16,36,55		
2	138		-14				330Ω	R3,R23		
6	139		-58				470Ω	R20,22,30,31,33,41		
1	140		-38				510Ω	R27		
6	141		-31				680Ω	R142,41-50		
6	142		-01				1KΩ	R2,5,6,7,8,43		
3	143		-53				2KΩ	R9,10,26		
6	144		-18				2.2KΩ	R11,19,21,32-34		
1	145		-69				1.5KΩ	R40		
4	146		-12				22KΩ	R12,35,39,52		
2	147	B	901550-07			RESISTOR CARBON	1/4W ±5% 100KΩ	R25,R44		
	148									

commodore	TITLE: PCB ASSY. VIC-1541		DATE: 11/14/82	ENGR: JH	SIZE: B	REV: C	SHT: 5
	1540048		11/14/82	JH	B	C	5

commodore

TITLE: PCB ASSY. VIC-1541

DATE: 11/1/82

DRAWN BY: J. J. Kuhl

DATE: 11/1/82

ENGR: J. J. Kuhl

DATE: 12/2/82

SIZE: B

REV: C

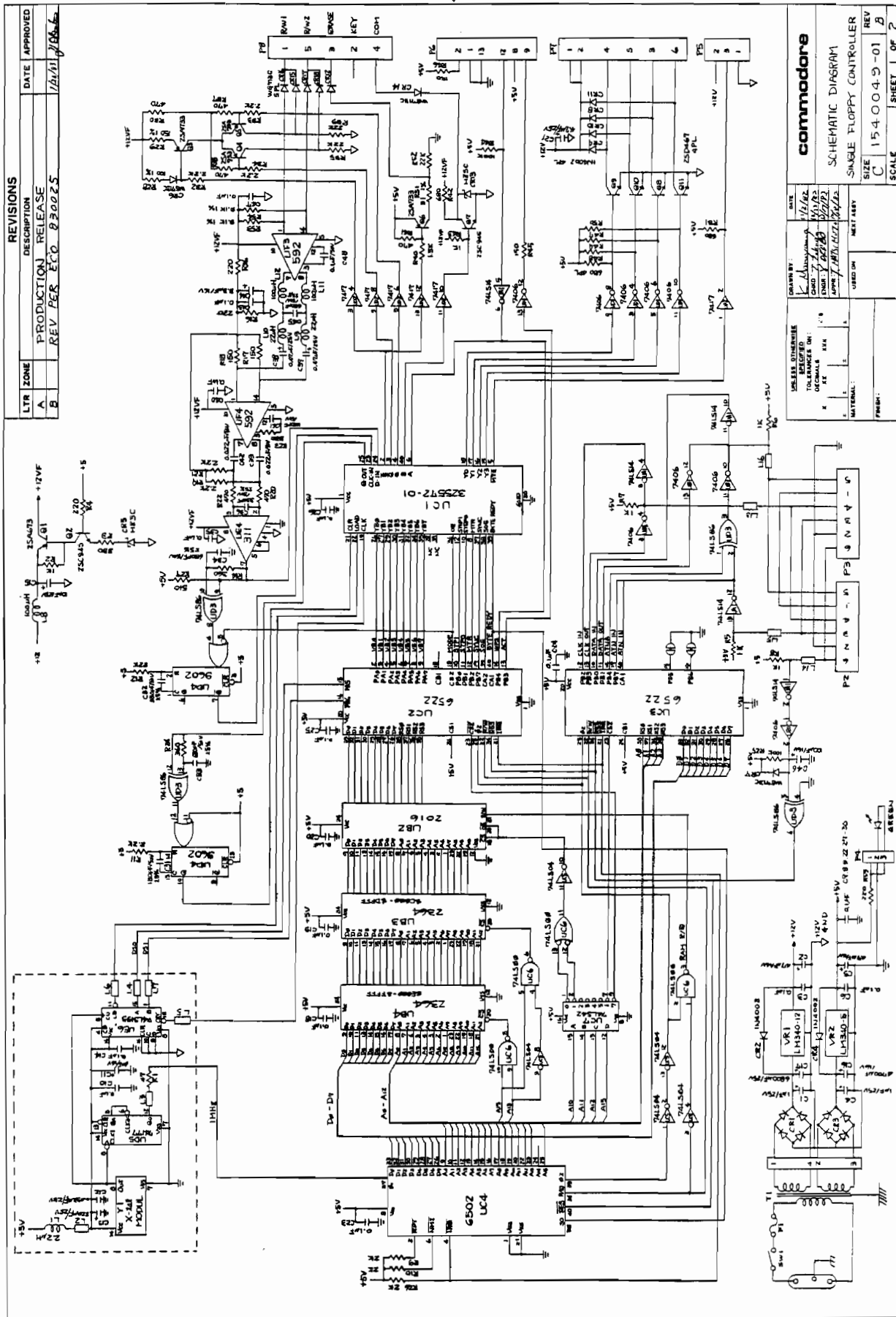
REV: 5/8

QUANTITY REQD PER PART / DASH NO.		QTY	QTY	PART NUMBER	DESCRIPTION	REF DES	REMARKS	NOTES
1	149	B	901751-43	RESISTOR METAL OXIDE 1/4W ±1% 91Ω	R51			
1	150	B	-18		R20			
1	151	B	-44		R29			
2	152	B	901751-45	RESISTOR METAL OXIDE 1/4W ±1% 9.1KΩ	R52, R54			
	153							
	154							
	155							
	156							
	157							
10	158	B	325563-01	FERRITE BEAD	L2-7,13-16			
5	159	B	903025-01	FERRITE BEAD	L2-7,13-16		SUBSTITUTE FOR ITEM 158.	
	160							
	161							
	162							
2	163	B	4022048	SHIELD BOX				
2	164	B	4022047	SHIELD CAP				
2	165	B	1540023	HEAT SINK 70-3				
1	166	B	1540011	HEAT SINK REGULATOR				
1	167		904907-01	COMPOUND THER FOR HEAT SINK				
	168							
	169							
	170							
	171							
4	172	B	325541-05	SCREW PAN HEAD/EXT TOOTH WASHER M3-12				
2	173	B	905665-03	EXTERNAL TOOTH WASHER M3				
4	174	B	905960-03	NUT HEX. M3				
	175							
	176							
4	177	B	905477-02	TUBING VINYL 3.5 DIA X 5MM				
	178							
	179							
	180							
	181							
	182							
	183							
	184							
	185							

commodore

PCB ASSY. VIC-1541

DATE	9/16/72	ENGR	10	DATE	12/77	SIZE	B	REV	C	QTY	68
APPR	17.1				12/78						
DRAWN BY: J. Tokuda											
CHKD:											



2 THIS ROM CAN BE USED ON ONLY USA · CANADA
AND JAPAN VERSION FOR SUBSTITUTE FOR ITEM 35.

**1. SHEET 68.7 OF 7 ARE B-SIZE
ASSY DWG.
NOTES.**

c b m ENGINEERING OSAKA JAPAN	TITLE PCE ASSY	DRAWN BY: Y. HIGUCHI	DATE	DATE	SIZE	SHEET
			CHKD: C. T.			

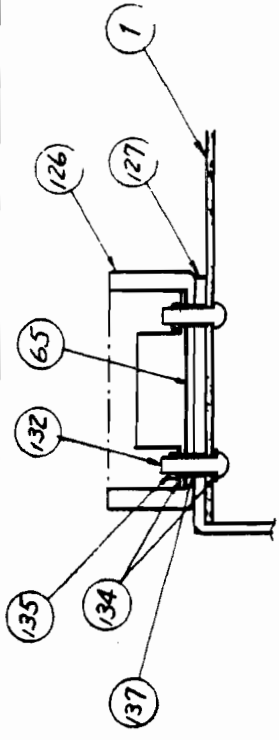
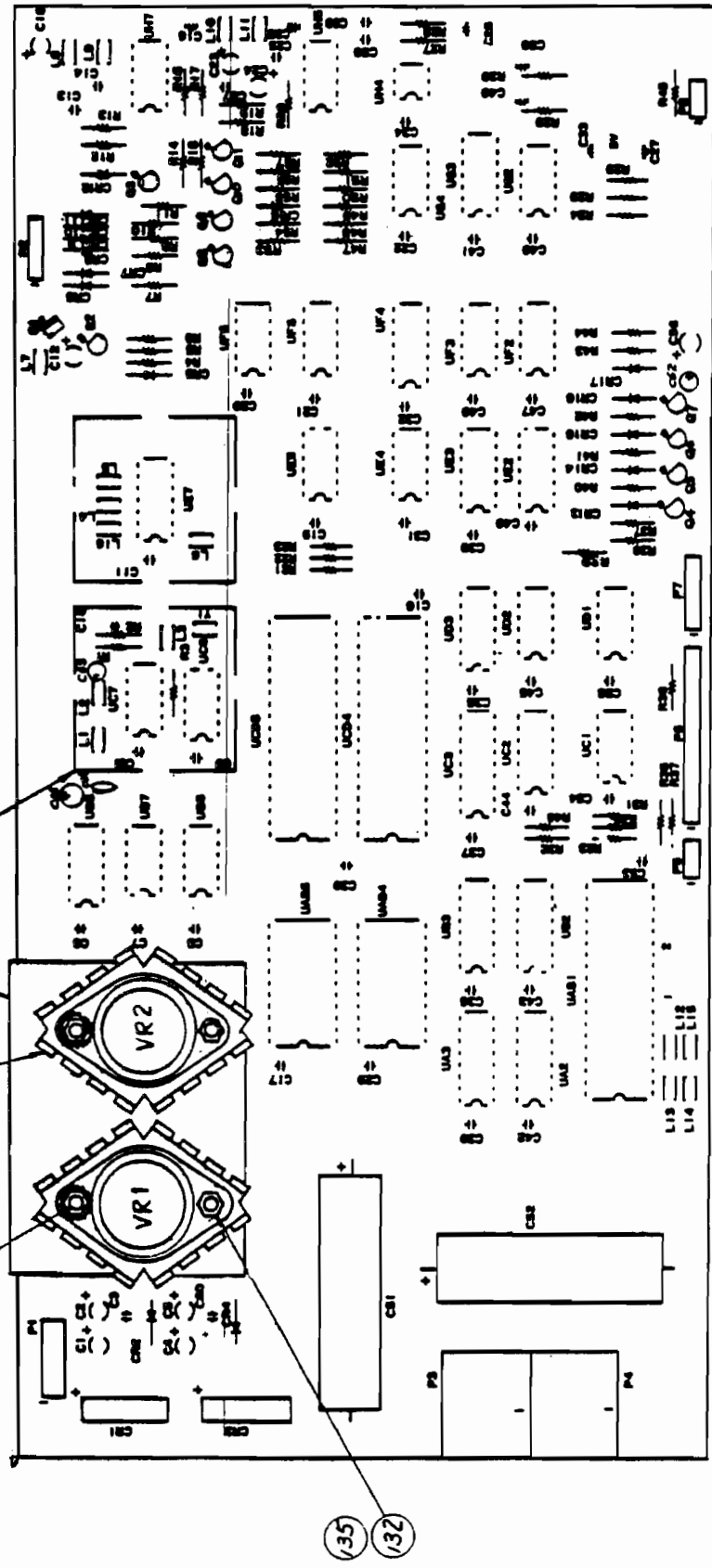
QUANTITY REQD PER PART/DASH NO.		QTY	PART NUMBER	DESCRIPTION	REF. DES	NOTES
2	03	2	902671	TRANSISTOR NPN 2SC945	Q2, Q3	SUBSTITUTION FOR ITEM 37
5	38	1	902693-01	NPN 2SC1815	Q2, Q3	
4	39	1	902679	NPN 2SD467	Q4-Q7	SUBSTITUTION FOR ITEM 39
5	40	1	902682	NPN 2SD2120	Q4-Q7	
1	41	1	902720	PNP 2SA673	Q1	
4	42	1	902717	PNP 2SA733	Q8-Q11	
5	43	1	902744-01	TRANSISTOR PNP 2SA1015	Q8-Q11	SUBSTITUTION FOR ITEM 42
5	44	1	901522-30	IC 7407	UG4	SUBSTITUTION FOR ITEM 33
6	45	1	900750-02	DIODE, SIGNAL 1N4002	CR4, 13-16	
8	46	1	900850-05	SIGNAL 1N4148	CR6-11, 17, 18	
5	47	1	900850-01	SIGNAL 1N4148	CR6-11, 17, 18	SUBSTITUTION FOR ITEM 47
1	48	1	325505-01	RESER 3.3V 500MW ±5%	CR5	HZ3C-2
1	49	1	325505-02	3.3V 500MW ±5%	CR5	HZ4A-1 SUB. FOR ITEM 49
5	50	1	900948-06	3.3V 500MW ±5%	CR5	1N5226B SUB. FOR ITEM 49
1	51	1	325506-01	5.1V 500MW ±5%	CR12	HZ5C-2
1	52	1	900948-11	5.1V 500MW ±5%	CR12	1N5231 SUB. FOR ITEM 52
1	53	1	900756-01	BRIDGE 1.5A 50V	CR1	KBP005
1	54	1	900755-02	DIODE, BRIDGE 4A 50V	CR3	KBL-02
1	55	1	900556-02	CRYSTAL 16MHz	Y1	
1	56	1	325513-01	COIL, INDUCTOR 2.2mH	L1	
2	57	1	325513-02	COIL, INDUCTOR 22mH	L8, L11	
3	58	1	325513-03	COIL, INDUCTOR 100mH	L7, L9, L10	
1	59	1	901528-04	VOLTAGE REGULATOR 12V 1.5A	VR1	LM340-12
1	60	1	901528-01	VOLTAGE REGULATOR 5V 3A	VR2	LM323
2	61	1	904914	INSULATION MYLAR 70-3		ATTACHED WITH VOLT REGULATOR
5	62	1	325551-01	INSULATION SILICONE 70-3		SUBSTITUTION FOR ITEM 65.
2	63	1	903361	CONNECTOR, DIN 6 PIN	P3, P4	HOSHIDENKI TCS4460-01-101
3	64	1	904150-06	SOCKET IC LOW PRO. 40PIN		
2	65	1	904153-03	SOCKET IC LOW PRO. 24PIN		
2	66	1				
2	67	1				
2	68	1				
3	69	1				
2	70	1				
2	71	1				
2	72	1				
c b m ENGINEERING OSAKA JAPAN		TITLE: PCB ASSY VIC-1540		DRAWN BY: CHKD. J. Takahashi	DATE: 1/1/11	DATE: 1/1/11
				APPR: 1/1/11	DATE: 1/1/11	DATE: 1/1/11
				SIZE: B	DATE: 1/1/11	DATE: 1/1/11
				1540001-	DATE: 1/1/11	DATE: 1/1/11
				3 of 7	DATE: 1/1/11	DATE: 1/1/11

QUANTITY REQD PER PART /DASH NO.		QTY	W D	PART NUMBER	DESCRIPTION	REF. DES	QTY	NOTES
1	1	1	73	325514-04	HEADER ASSY 2.5 PICH RANGE 4PIN	P2	1	MOLEX 5049-04AG
1	1	1	74	325515-06	6PIN	P7	1	3094-06A
1	1	1	75	325515-15	15PIN	P6	1	3094-15A
2	2	2	76	325515-03	2.5 PICH RANGE 3PIN	P5, P8	1	3094-03A
1	1	1	77	903316-04	HEADER ASSY 3.96 PICH 4PIN	P1	1	MOLEX 5271-04A
1	1	1	78					
1	1	1	79	900100-03	CAP. ELECTROLYTIC 220UF/25V	C65	1	
1	1	1	80	900101-44	CAP. ELECTROLYTIC 1000UF 16V	C52	1	AXIAL LEAD P22x52
1	1	1	81	900101-45	6800UF 25V	C51	1	AXIAL LEAD P22x52
2	2	2	82	900100-33	47UF 16V	C2, C5	1	
2	2	2	83	900100-32	ELECTROLYTIC 1UF 25V	C1, C4	1	
1	1	1	84	900402-15	TANTALIUM 10UF 25V	C12	1	
1	1	1	85	900402-11	TANTALIUM 3.3UF 25V	C23	1	
1	1	1	86	900010-51	CERAMIC 48PF 50V	C10	1	
1	1	1	87	900010-52	150PF 50V	C33	1	± 5%
2	2	2	88	900010-53	330PF 50V	C28, C49	1	± 5%
3	3	3	89	900010-54	680PF 50V	C16, C27, C50	1	± 5%
1	1	1	90	900010-25	1000PF 50V	C26	1	
40	40	40	91	900010-20	0.1UF/50V	C3, 6, 9, 11, 13, 14, 17-22	1	28, 29, 32, 34-48, 53-65, 67, 69, 61
2	2	2	92	900010-14	CERAMIC 0.022UF 50V	C58, C59	1	
1	1	1	93	900100-40	ELECTROLYTIC 100UF 16V	C56	1	
2	2	2	94	900402-17	CAP. TANTALIUM 0.47UF 16V	C15, C24	1	± 20%
1	1	1	95	900402-08	CAP. TANTALIUM 4.7UF 25V	C62	1	
1	1	1	96	900402-14	CAP. TANTALIUM 1UF/10V	C63	1	
1	1	1	97	900465-02	CAP. CERAMIC 0.033UF/25V	C64	1	
2	2	2	98	901550-108	RESISTOR, CARBON 1/4W 5% 360Ω	R25, R30	1	
1	1	1	99	901550-56	RESISTOR, CARBON 1/4W 5% 47Ω	R3	1	
4	4	4	100	901550-89	RESISTOR, CARBON 1/4W 5% 150Ω	R8, R9, 35, 36	1	
4	4	4	101	901550-52	220Ω	R4, 16, 17, 45	1	
5	5	5	102	901550-14	330Ω	R1, 2, 5, 20, 37	1	
6	6	6	103	901550-58	470Ω	R27, R28, 30, 35, 57	1	
1	1	1	104	901550-38	510Ω	R24	1	
5	5	5	105	901550-31	680Ω	R9, R39-R42	1	
8	8	8	106	901550-01	1 KΩ	R6, 11, 31-34, 44, 53	1	
4	4	4	107	901550-53	2 KΩ	R21-R23, R38	1	
6	6	6	108	901550-18	RESISTOR, CARBON 1/4W 5% 2.2KΩ	R5, 10, 24, 51, 52, 56	1	
c b m ENGINEERING OSAKA JAPAN		TITLE: PCB ASSY VIC-1540		DRAWN BY: Ckd. P. Takami		DATE: 1/1		DATE: 1/1
						SIZE B		DATE: 1/1
						1540001-		DATE: 1/1
						4 of 7		DATE: 1/1

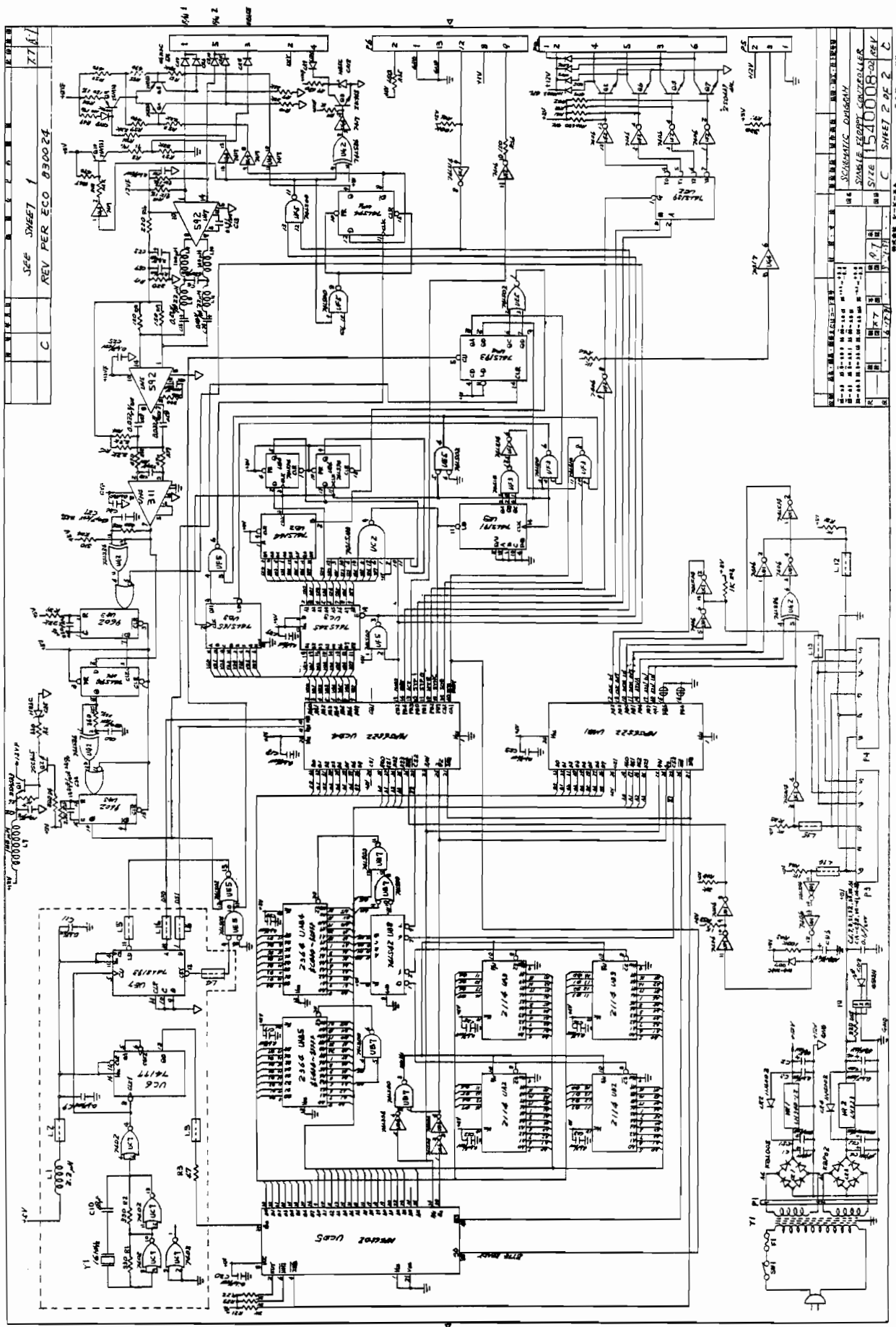
REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		
				1.7

- (135) (137) (134) 2 PLS (132)
- (126) (127)
- (124) (125) 2 PL



C b m		OSAKA JAPAN	
PCB ASSY.		VIC-1540	
SIZE	B	REV	1540001-03 E
SCALE 1/16" = 1"		SHEET 6 OF 7	
DATE	9/4/67	NEXT ASBY	
DESIGNED BY	J. T. K. K. K.	USED ON	
CHECKED BY		VIC-1540	
ENGINEER		VIC-1541	
APP'D			
MATERIAL			
PUSH			



REV PER ECO B30024
C
7761

SCHEMATIC DIAGRAM
SIZE 1500000
C
SHEET 2 OF 2
3/1/77

PART NO.	DESCRIPTION	REV	DATE	BY	REASON	REV	DATE	BY	REASON
1540002-01	POWER SUPPLY ASSY VIC-1540 UL	A	8/26/81		PRODUCTION RELEASE	67			
		B			CHANGED FILTER POWER CONNECTOR FOR CSA (ITEM 24 WAS ITEM 23)	7.7	67		
		C	8/26/81		CHANGED FILTER POWER CONNECTOR FOR FCC (ITEM 25 WAS ITEM 23)	7.7	67		
		D	8/27/81		CHANGED ACCESSORY OF TRANSFORMER	7.7	67		
		E	8/27/81		CHANGED SCREW TO M3-6 FROM M3-8.	7.7	67		
		F	8/27/81		ADDED DASH 06 THRU 10 AND ITEM 21.	7.7	67		
		G	8/27/81		ADDED ITEM 8, 9 AND 63.	7.7	67		
		H	8/27/81		ADDED SHEET 5 OF 5.	7.7	67		
					REVISED PER ECO 830060	80			
					REVISED PER ECO 830101	80			

4. NO CHANGE QTY FOR ITEM 54 IF USED ITEM 6 OR 7.

3. USE ONLY WHEN USED ITEM 8 OR 9.

2. IF ITEM 8 OR 9 ARE USED THEN QTY FOR ITEM 54 WILL CHANGE FROM 7 TO 9 PCS AND USED WITH ITEM 63.

1. SHEET 4 & 5 OF 5 ARE D-SIZE

ASSY DWG.

NOTES.

c b m ENGINEERING OSAKA JAPAN	TITLE POWER SUPPLY ASSY VIC-1540	DRAWN BY Y. IMAI	DATE	DATE	SIZE	SHEET 1 of 5
			7/1/81	7/1/81	B	

[illegible]

QUANTITY REQD PER PART / DASH NO.		QTY	PART NUMBER	DESCRIPTION	REF. DES	QTY	NOTES
06	01	37					
		38					
		39					
1		40	B 200017 -03	LEAD WIRE (BLACK)			101.5 ANG-18 L150MM
1		41	B 200017 -04	LEAD WIRE (BLACK)			101.5 ANG-18 L30MM
		42					
		43					
1		44	B 1540010	GROUND CABLE ASSY			
		45					
		46					
7		47	B 905476 -02	TUBING SHRINCABLE			φ5x20
1		48	B 905476 -04	TUBING SHRINCABLE			φ4x40
		49					
		50					
		51					
2		52	B 906803-02	SCREW FLAT HEAD M3x8			FILTER CONNECTOR (2)
7		53					
		54	B 325541-02	SCREW PAN HEAD M3X6 W/EXT	TOOTH WASHER PCB (5), SEE NOTE 2		
		55					
4		56	B 906610-03	SCREW PAN HEAD NO.6-32 UNC L110mm			FLOPPY DISK (4)
2		57	B 325542-02	SCREW PAN HEAD M4X6 W/EXT	TOOTH WASHER		GROUND (2)
		58					
		59					
		60					
		61					
		62					
2		63	B 1540051	METAL, L-ANGLE			SEE NOTE 2
		64					
		65					
		66					
		67					
		68					
		69					
		70					
		71					
		72					
c b m ENGINEERING OSAKA JAPAN		TITLE: POWER SUPPLY ASSY VIC-1540			DRAWN BY: Y. IMAGAWA	DATE: 7/1/81	DATE: 7/1/81
					CHKD: T. Takase	DATE: 8/21/81	DATE: 8/21/81
					APPR:	DATE: 1/1	DATE: 1/1
					B 1540002-		3 of 5

